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IS 12251 (1987, Reaffirmed 1992): Code of Practice for Drainage of Building Basements. UDC 696.13.721.011.245 : 69.001.3

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“Knowledge is such a treasure which cannot be stolen”

IS : 12251 - 1987
(Reaffirmed 1992)

REAFFIRMED

Indian Standard

CODE OF PRACTICE FOR DRAINAGE OF BUILDING BASEMENTS

(First Reprint APRIL 1999)

UDC 696·13·721·011·245 : 69·001·3

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B U R E A U O F I N D I A N S T A N D A R D S
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NEW DELHI 110002

Gr 2 *July* 1988

Indian Standard

CODE OF PRACTICE FOR DRAINAGE OF BUILDING BASEMENTS

0. FOREWORD

0.1 This Indian Standard was adopted by the Bureau of Indian Standards on 20 November 1987, after the draft finalized by the Water Supply and Sanitation in Buildings Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Generally, in all multistoreyed buildings, there are basements which are used for parkings, for having the plant room or other utility purposes. The garbage chute installed in multistoreyed buildings also terminates in the basement. Sometimes common toilets are also situated in the basement.

0.3 In hotels and theatres, the basement plays a very important part because the equipment like airconditioner, machinery and other ancillary equipment is placed in the basement. In hotels, the basement has got much more importance because their godowns, grocery, confectionery and other offices are also situated in the basement besides the equipment.

0.4 Generally, the bottom of the basement is invariably lower than the adjoining road where the municipal services run to which the drainage of the basement has got to be connected. The entry to the basement is ramped down from the main or side road. During rain, surface runoff from the adjoining area and roads may enter the basement down this ramp. Secondly, during monsoon period, the sub-soil water or water from the side walls may enter the basement and cause damages to the building and equipment. During floor wash or car wash, in case of basement being used for parking, water accumulated need to be drained off. This standard is being prepared with a view to give guidance for providing proper collection and disposal of storm water and sewage in the basement.

0.5 It is recommended that basement walls should be designed for water pressure even in sites where subsoil water level is much below the basement assuming water table exists at one-third of the depth of the basement above the basement floor level.

1. SCOPE

1.1 The standard covers methods for basement drainage both for sewage and storm water.

2. GENERAL

2.1 Water may be prevented from remaining in contact with basement walls or floors for long periods by installing a system of drainage round the wall footings or beneath the floor or both together. The provision of drainage around the perimeter of the basement is recommended for any site where the ground water table is likely to rise above the top of the footing. These drainage should be placed beside the wall footing and should be graded to an open outlet or storm water sewer or to a sump within buildings where pumps are provided.

2.2 A sump shall be constructed where the basement waste water is connected. The sump shall be water tight and the water from the sump shall be pumped off either by a portable pump in case of area with less frequency of rainfall or by permanent pump, non-clog type, with automatic start and stop arrangement. In case of a portable pump, heavy duty GI pipe [*see* IS : 1239 (Part 1) - 1979*] with a coupling arrangement suitable for connecting to the outlet of the pump, shall remain fixed in the wall above the sump where the outlet of portable pump is connected. The water shall be pumped to the municipal sewer, and silt and sand trap shall be provided before joining the municipal sewer. Non-return valve shall be provided in the discharge pipe just after the pump.

2.3 Below the terminating point to the chute, generally a trolley is kept and the chute is periodically washed with the result that the water accumulated at the bottom creates unhealthy conditions. Therefore, a cast iron deep seal gully trap covered with a grating shall be installed below the terminating point of the chute so that the water accumulated by periodical washing of the chute can be connected to the sump.

2.4 An automatic electric changeover system is desirable for the pumps installed on the sump so that in case one pump fails, the second should start automatically.

3. SEWAGE DISPOSAL

3.1 In many cases, toilets have been provided in the basement. In general, no toilet shall be allowed to be located in the basement until and unless the following points have been satisfied:

a) Soil line from the WC can directly be connected to the external building sewers or to the municipal sewers running outside the building premises at a depth below the level

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*Specification for mild steel tubes, tubulars and other wrought steel fittings : Part 1 Mild steel tubes (*fourth revision*).

of WC and precautions shall be taken to prevent backflow.

b) All such connections shall be through manholes only.

c) Minimum slope of such sewers up to the building/municipal sewers shall be 1 : 100.

d) Adequate protection shall be taken in case this connecting sewer crosses water supply line of the building. As far as practicable, such crossing shall be avoided.

e) Appropriate permission shall be taken from the municipal authority for such connection and all connection work shall be done in the presence of representative of the municipal authority.

f) All pipelines used for such connection shall conform to IS : 1536 - 1976*.

3.2 Designer shall decide the size of pipeline depending upon the numbers of WC being connected. But in no case such pipeline shall be less than 100 mm diameter. Clean out point for prodding, in case of blockage, shall be provided.

3.3 In case the pipeline after the gully trap runs more than 30 metres before it reaches the sewer line, manholes for inspection and maintenance at an interval of 30 metres shall be provided.

4. STORM WATER DRAINAGE

4.1 Storm water runoff from adjoining area and roads may enter into the basement down the ramp. For draining off such water, the following minimum needs to be considered while planning the basement:

a) Before the ramp starts, a minimum of two humps (*see* Fig. 1) at a spacing of 6·0 m with a channel with top gratings shall be provided, to arrest the runoff from roads. The size of the channel shall be decided by the designer after considering the rainfall and the area from which runoff may come to the point of consideration. But in no case, the width of the channel shall be less than 600 mm for easy maintenance. This channel shall ultimately discharge water in the existing municipal drain or building drains or in such place from where chances of backflow will not be there.

b) Where there is a possibility of runoff from the adjoining area of the ramp a parapet wall of minimum height of 750 mm by the side of the ramp shall be constructed.

c) To catch the runoff from the ramp, a catch drain with top gratings, similar to the one as provided at the start of the ramp shall be provided (*see* Fig. 1 and 2). The size of the channel shall be determined after considering the rainfall, area of the ramp and other such factors. In no case, the size of the channel shall be less than 200 mm in width and 200 mm in depth. This catch drain shall discharge the water into a sump of adequate size. The pump should be provided on the sump to pump the water to a suitable discharge point. Generally, the floor adjoining the channel shall slope towards the channel.

d) Depending on the use of the basement floor and expected frequency of washing, channel shall be provided along the wall of the basement which shall discharge water ultimately into the sump. The size and pattern of the channel shall depend on the frequency of floor/car wash, area of the basement floor, use of the basement floor, but in no case shall be less than 150 × 150 mm in size, with a minimum slope of 1 : 800. There may be more than one sump depending on the floor area. Water from the sump shall be pumped to discharge the same in the adjoining ground level in the building so that the same gets its way to the municipal system.

e) Basement having automatic sprinkler system for fire fighting shall be provided with channel, the pattern and size of which shall be determined on the basis of the sprinkler system.

f) In general, a slope of about 1 : 200 towards the drainage channel near the wall shall be provided in basement floors to facilitate easy flow of water towards the drain.

5. PREVENTION OF SUBSOIL WATER

5.1 In addition to the provision made in IS : 456 - 1978*, all construction joints in walls and floors shall be filled with approved sealant materials. All expansion joints in walls and floors shall be provided with water stop. The RC concrete used in basement floors and walls shall be mixed with water-proof compound. The outside of the basement wall shall be coated with two coats of bituminous paints after a thorough checking of the wall to ascertain that no cracks have been developed. In case any cracks have been located, the same shall be treated to ensure no leakage of water.

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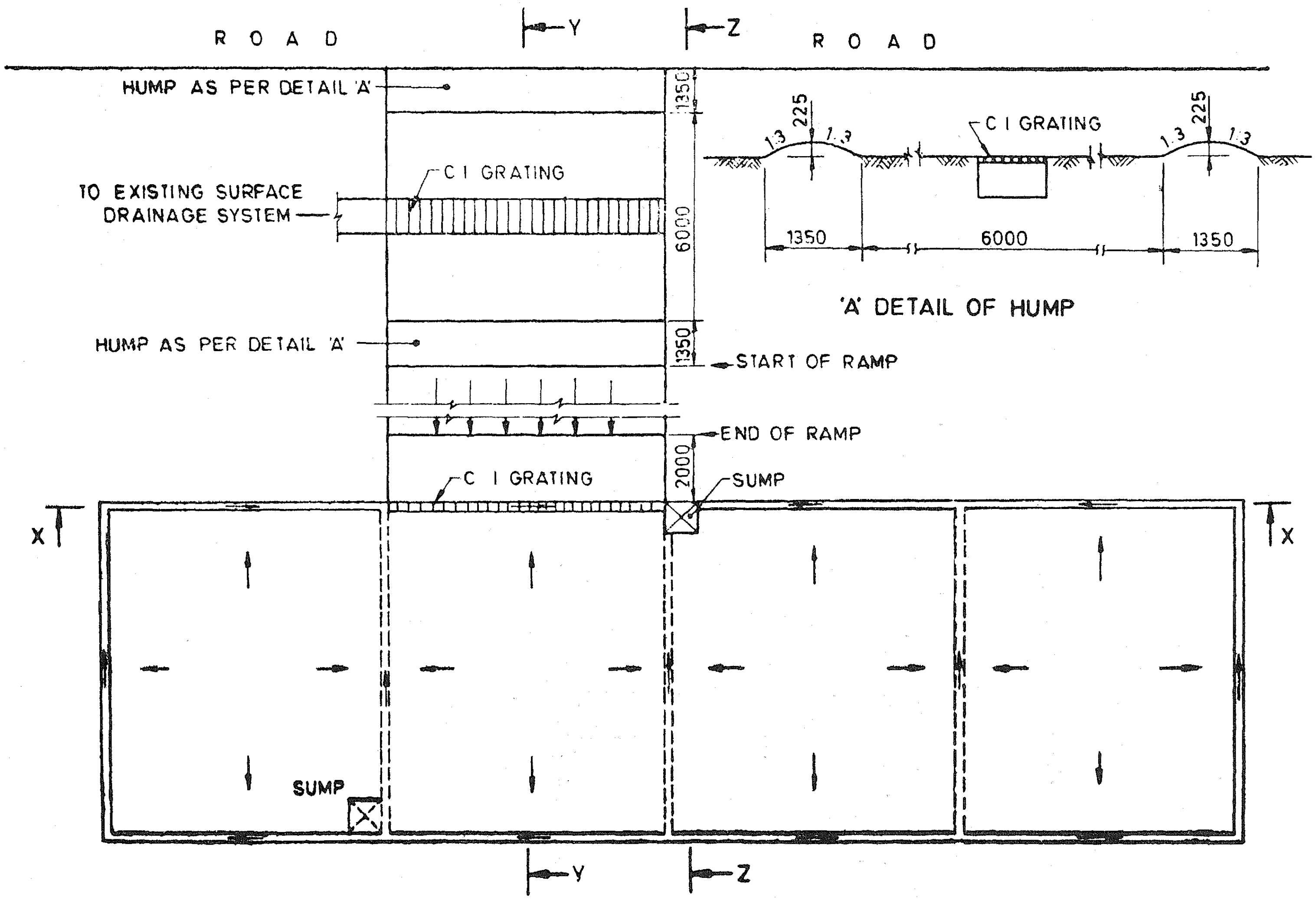
*Specification for centrifugally cast (spun) iron pressure pipes for water, gas and sewage (*second revision*).

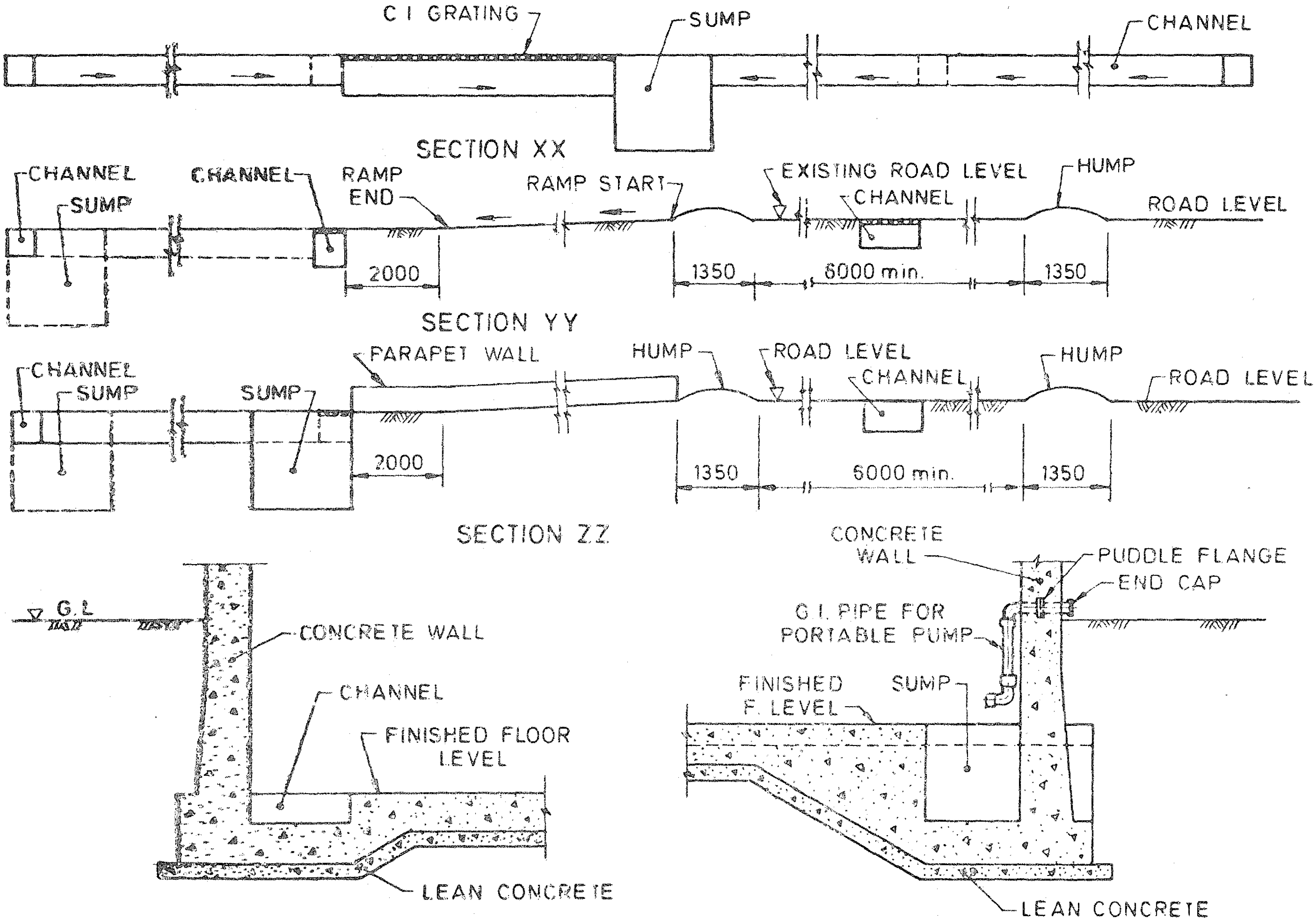
*Code of practice for plain and reinforced concrete (*third revision*).



NOTE—Drains and sump shown in Fig. are to be decided at site by the designer.

All dimensions in millimetres.

FIG. 1 TYPICAL ARRANGEMENT OF DRAINAGE IN BASEMENT



All dimensions in millimetres.

FIG. 2 TYPICAL ARRANGEMENT OF CHANNEL AND SUMP